

CLAIMS

What Is Claimed Is:

- 1 1. An electronic inductor circuit comprising:
 - 2 a first transistor; and
 - 3 an operational amplifier having a positive and a negative input, and an output connected to a base of the first transistor.
- 1 2. The circuit of Claim 1, wherein the first transistor and the operational amplifier are combined to form a voltage-controlled current source with respect to a loop current.
- 1 3. The electronic inductor circuit of Claim 1, further comprising:
 - 2 a voltage divider forming a first node with the positive input of the operational amplifier;
 - 3 an input signal connected to the first node; and
 - 4 a first feedback line connected from an emitter of the first transistor to the negative input of the operational amplifier.
- 1 4. The electronic inductor circuit of Claim 3, further comprising:
 - 2 an impedance connected between the voltage divider and a second node formed by an output line of a diode bridge and a collector of the first transistor.
- 1 5. The electronic inductor circuit of Claim 4, further comprising a capacitor connected between the input signal and the first node.

1 6. The electronic inductor circuit of Claim 5, further comprising a resistor
2 connected to the emitter of the first transistor.

1 7. The electronic inductor circuit of Claim 6, further comprising a second
2 transistor wherein an emitter of the second transistor is connected to the diode bridge, a
3 collector of the second transistor is connected to the impedance, and a base of the second
4 transistor is connected to the collector of first transistor.

1 8. The electronic inductor circuit of Claim 6, wherein the operational
2 amplifier is a TLC2272 or equivalent, and the first transistor is a 2N2102 or equivalent.

1 9. The electronic inductor circuit of Claim 8, wherein the voltage divider is
2 formed by a $10\text{ k}\Omega$ and a $1\text{ k}\Omega$ resistor.

1 10. The electronic inductor circuit of Claim 9, wherein the impedance is 600
2 Ω .

1 11. The electronic inductor circuit of Claim 10, wherein the electronic
2 inductor is part of a telephone line interface circuit for use with a high-speed modem.

1 12. The electronic inductor circuit of Claim 5, further comprising:
2 a second transistor connected in a Darlington pair configuration with the
3 first transistor, such that a collector of the second transistor is connected to the
4 collector of the first transistor, and a base of the second transistor is connected to
5 the emitter of the first transistor;

6 a second feedback line connected between the base of the first transistor
7 and the negative input of the operational amplifier; and

8 a third feedback line connected between the emitter of the second
9 transistor and the negative input of the operational amplifier;

10 wherein the first, second and third feedback lines are selectively
11 connected one at a time to the negative input of the operational amplifier,
12 depending upon a desired voltage characteristic of the circuit.

1 13. A method of transmitting an AC modem signal onto a telephone line
2 using an electronic inductor transistor, the method comprising the steps of:

3 inputting the AC signal into a positive input of an operational amplifier;
4 inputting an output of the operational amplifier to a base of the electronic
5 inductor transistor;

6 feeding back a signal from an emitter of the electronic inductor transistor
7 to a negative input of the operational amplifier; and

8 driving the telephone line with a signal from a collector of the electronic
9 inductor transistor.

1 14. An electronic inductor circuit of the type having a transistor to drive an
2 AC signal and/or to draw a DC loop current, the improvement characterized by an
3 operational amplifier, having a positive and a negative input, wherein an output of the
4 operational amplifier is connected to a base of the transistor, the AC signal is connected
5 to the positive input, and an emitter signal of the transistor is fed-back to the negative
6 input of the operational amplifier.

- 1 15. An electronic inductor circuit comprising:
 - 2 a first circuit for controlling a DC loop current; and
 - 3 a second circuit for controlling an AC current.
- 1 16. The electronic inductor circuit of Claim 15, wherein the first circuit
2 comprises:
 - 3 a first transistor;
 - 4 a first operational amplifier having a positive and a negative input, and an
5 output connected to a base of the first transistor;
 - 6 a voltage divider forming a first node with the positive input of the
7 operational amplifier;
 - 8 a capacitor connected to the first node;
 - 9 an emitter resistance connected to an emitter of the first transistor; and
 - 10 a first feedback line connected from an emitter of the first transistor to the
11 negative input of the first operational amplifier.
- 1 17. The electronic inductor circuit of Claim 16, wherein the second circuit
2 comprises:
 - 3 a second transistor;
 - 4 a second operational amplifier having a positive and a negative input, and
5 an output connected to a base of the second transistor;

6 an impedance connected between a collector of the second transistor and
7 the positive input of the second operational amplifier;
8 a second emitter resistance connected to an emitter of the second
9 transistor;
10 an AC signal input to the positive input of the operational amplifier; and
11 a second feedback line connected from an emitter of the second transistor
12 to the negative input of the second operational amplifier.